**Le-Chatelier’s Principle Demo (See POE handout attached)**

Students will be able to determine equilibrium shift due to changes in concentration and temperature through observing changes in color.

Materials: solid CoCl2, conc. HCl, water, 3 test tubes, hot plate, ice bath (in beaker)

Caution: conc. HCl is used. Wear safety goggles and gloves. Make sure that the acidic solutions are covered and students are not exposed to its toxic acidic fumes. After demo, move the test tubes to a fume hood (if acidic solutions are not neutralized and disposed immediately).

Teachers’ Notes:

Co(H2O)6+2(aq) + 4 Cl-(aq) + heat  CoCl4-2(aq) + 6H2O(l) pink blue

1) Prepare 1 M solution of CoCl2 in water. The solution would be pink in color.

2) Fill about quarter of 3 test tubes with the prepared CoCl2 solution.

3) Add 3 drops of concentrated HCl in one of the test tubes. Let students predict and record the color change. The solution would turn to blue color.

4) Now add water to the blue solution in 3) so that the solution will turn back to pink color. Let students predict and record the color change.

5) Boil water in a beaker. Insert the second test tube from 2) in the boiling water. Let students predict and record the color change. The solution would turn to blue color.

6) Remove the test tube from water and allow it to cool. Let students record and predict the color change.

7) Insert the third test tube from 2) in an ice bath. Let students predict and record the color change.

Disposal: Neutralize the acidic solutions with base and dispose them in an inorganic waste container.